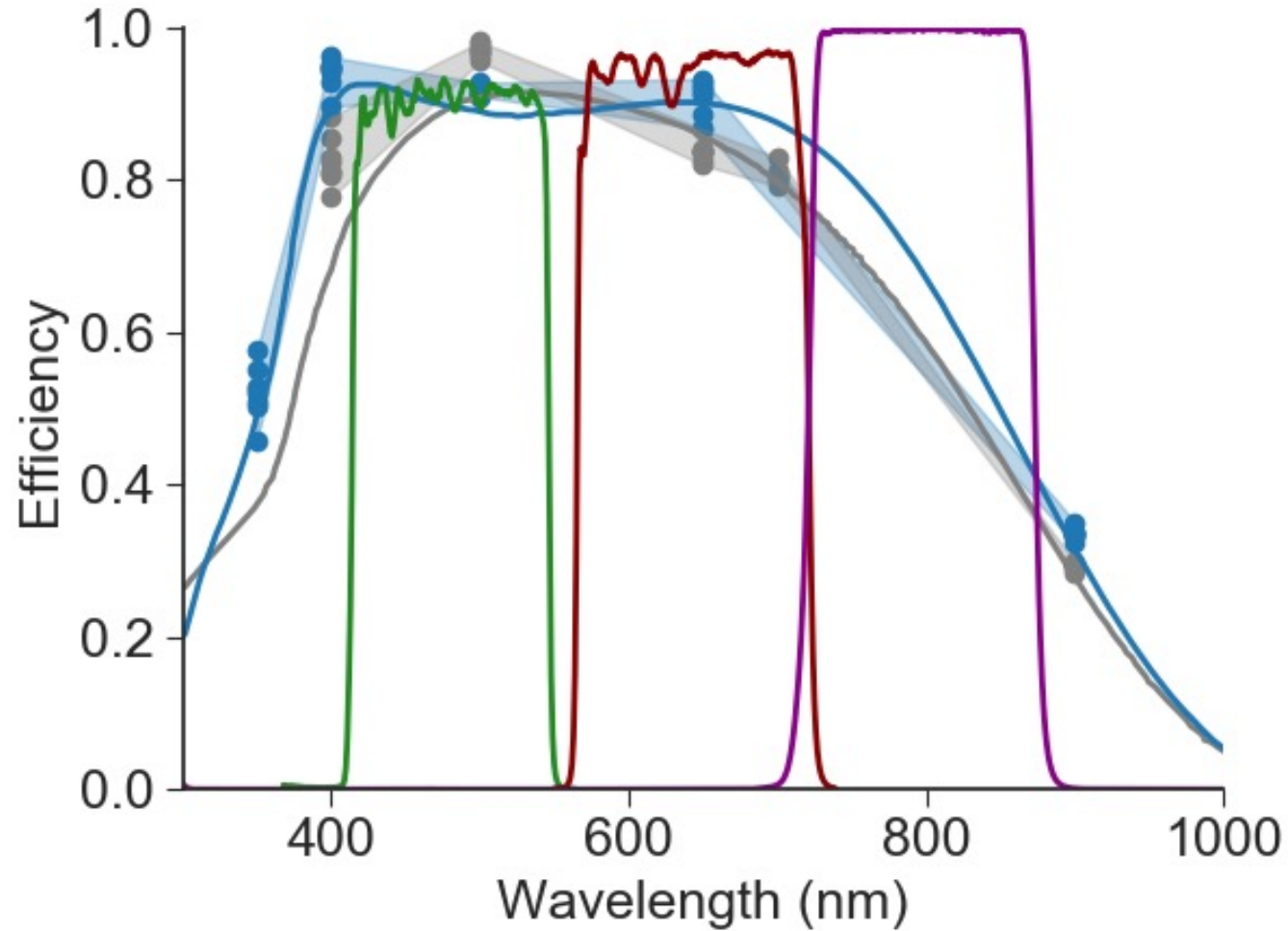
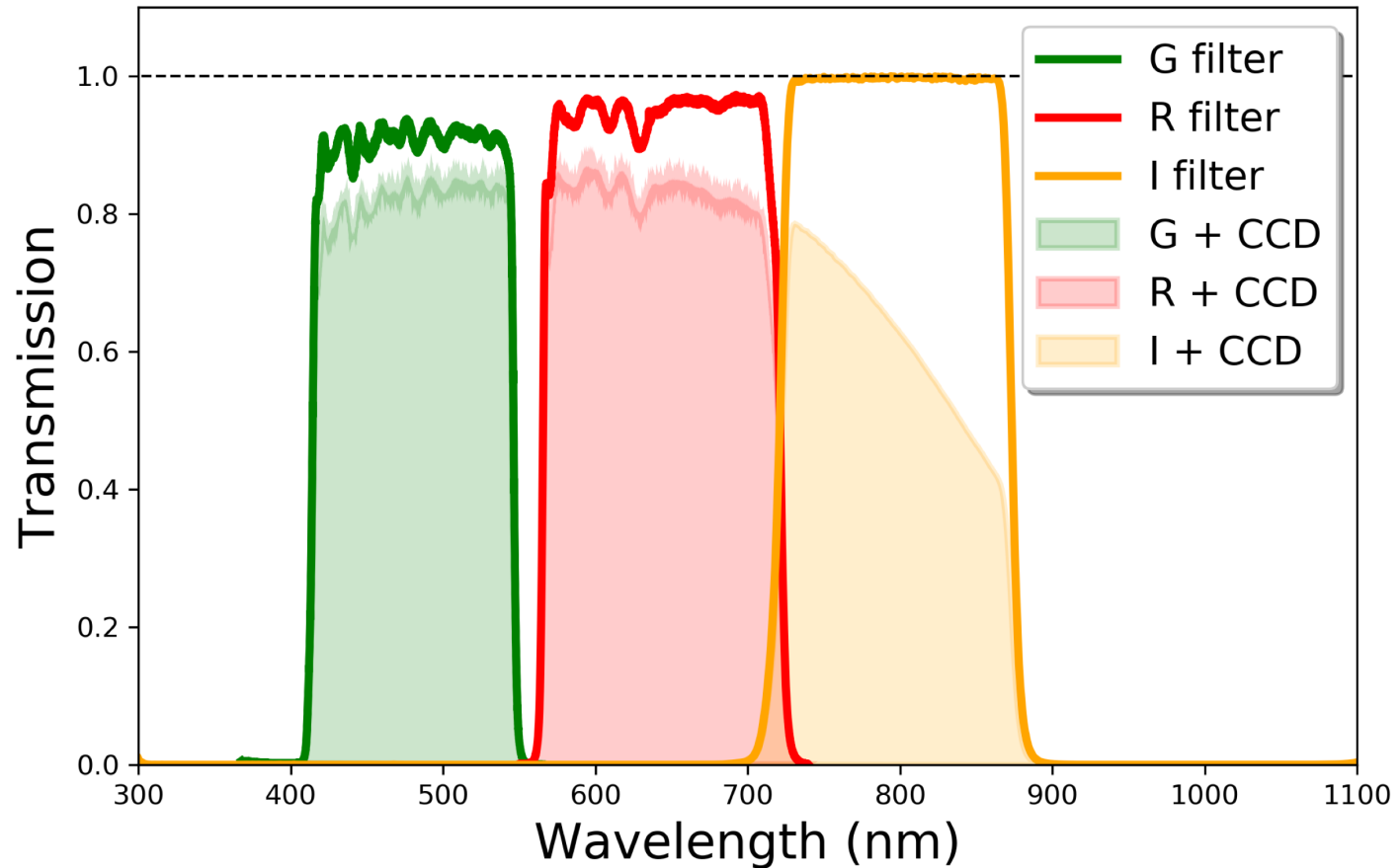


# ZTF Spectrophotometric Calibration



On-axis transmission for ZTF g,r,i-band filters and measured CCD quantum efficiencies (Bellm et al. 2019).

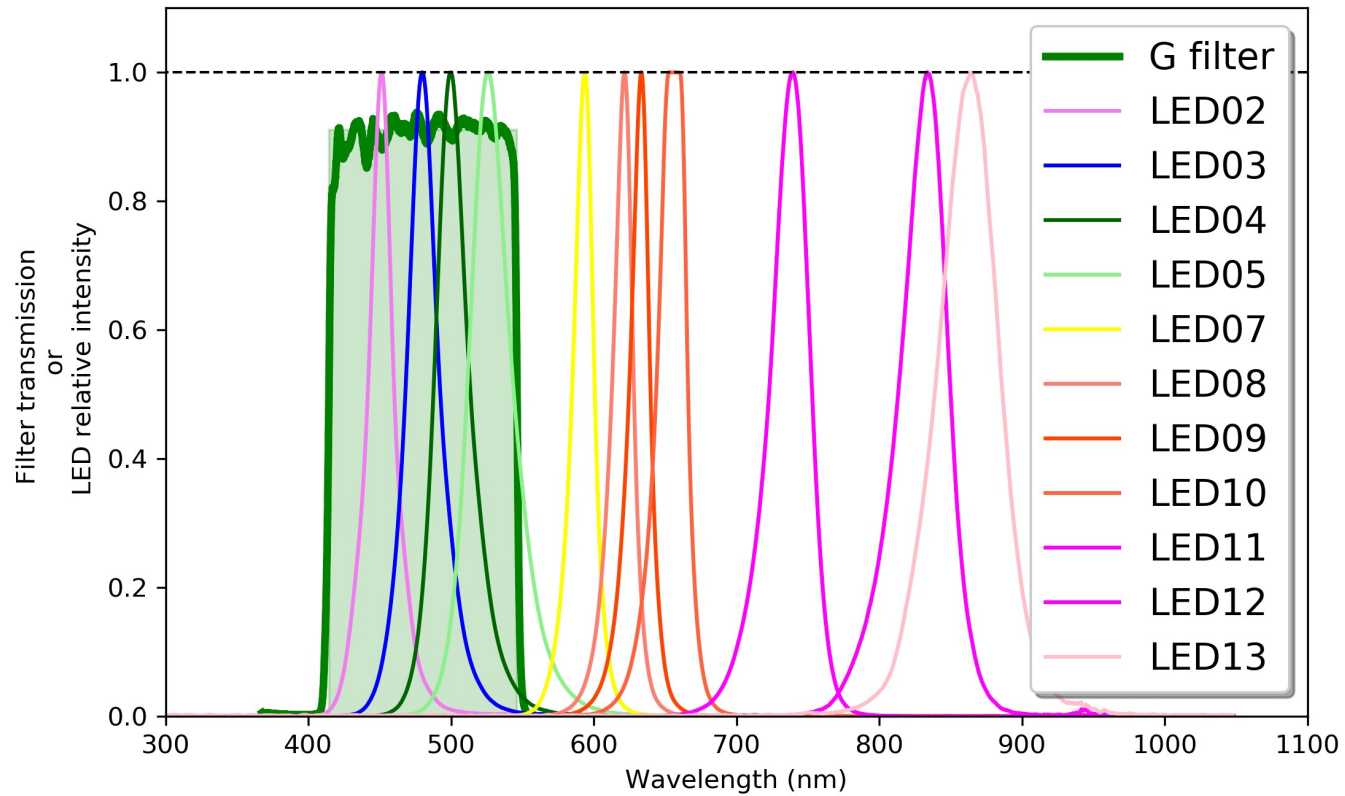
# Predicted transmission



Expected filter transmission with and without CCD quantum efficiency

# LED Calibration

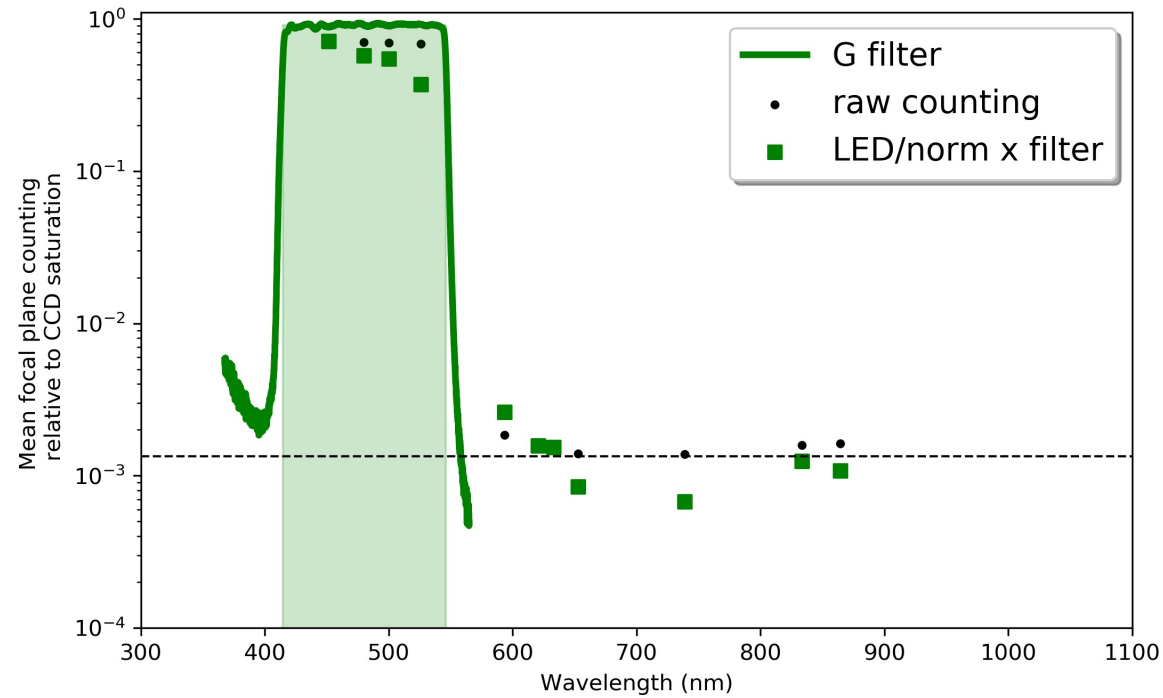
G filter transmission band versus LED spectra



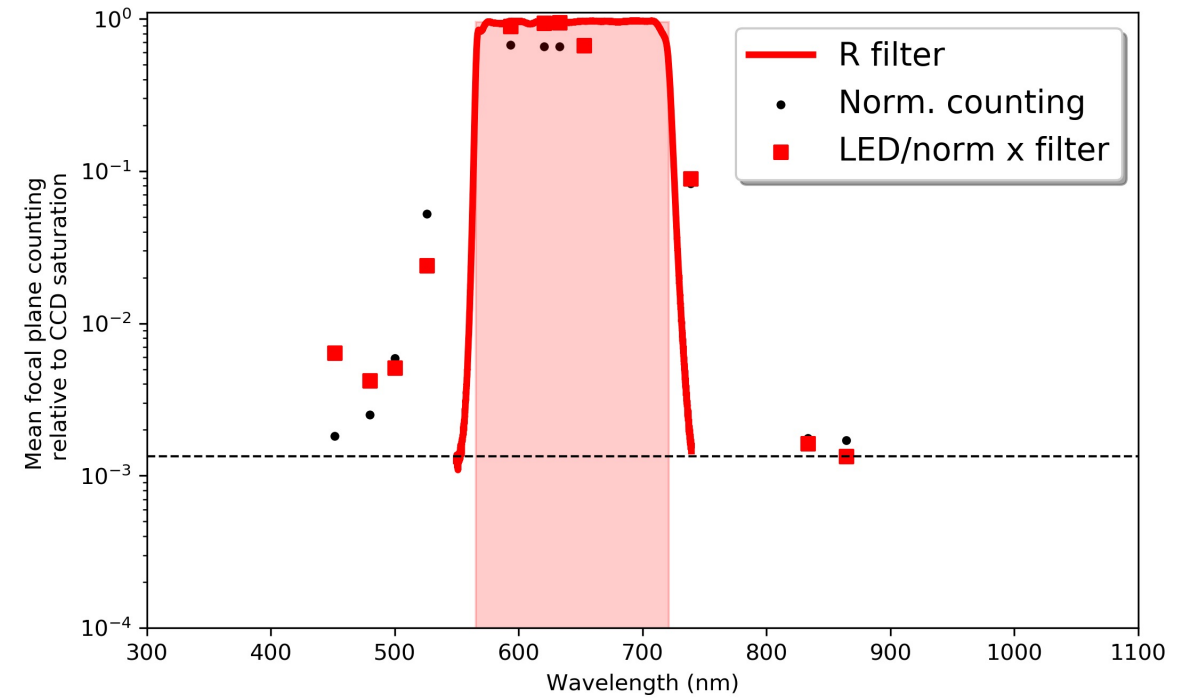
ZTF LED spectra and G-band filter throughput (Rosnet & Rigaut 2018) .

# ZTF Transmission

Mean focal plane response with G filter and LED on

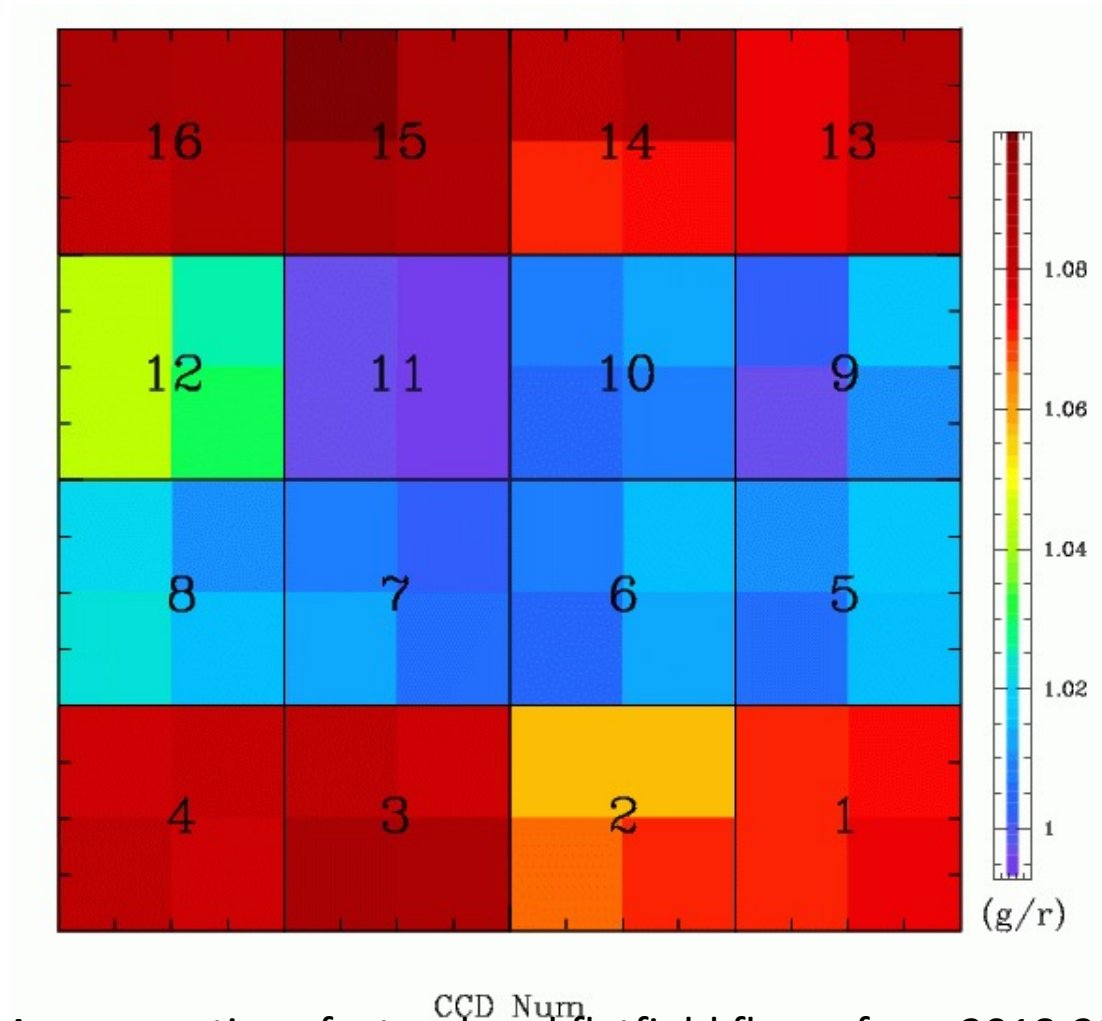


Mean focal plane response with R filter and LED on



Rosnet & Rigaut (2018) ZTF g and r-band calibration using LEDs

# ZTF CCD colour response



Average ratios of g to r-band flatfield fluxes from 2018-2019.

# Calibration system

*DECal: A Spectrophotometric Calibration System For DECam*

3

- Shine narrow bandwidth light on screen.
- Scan through range of wavelengths
- Measure fluxes at telescope entrance relative to regular filtered images.

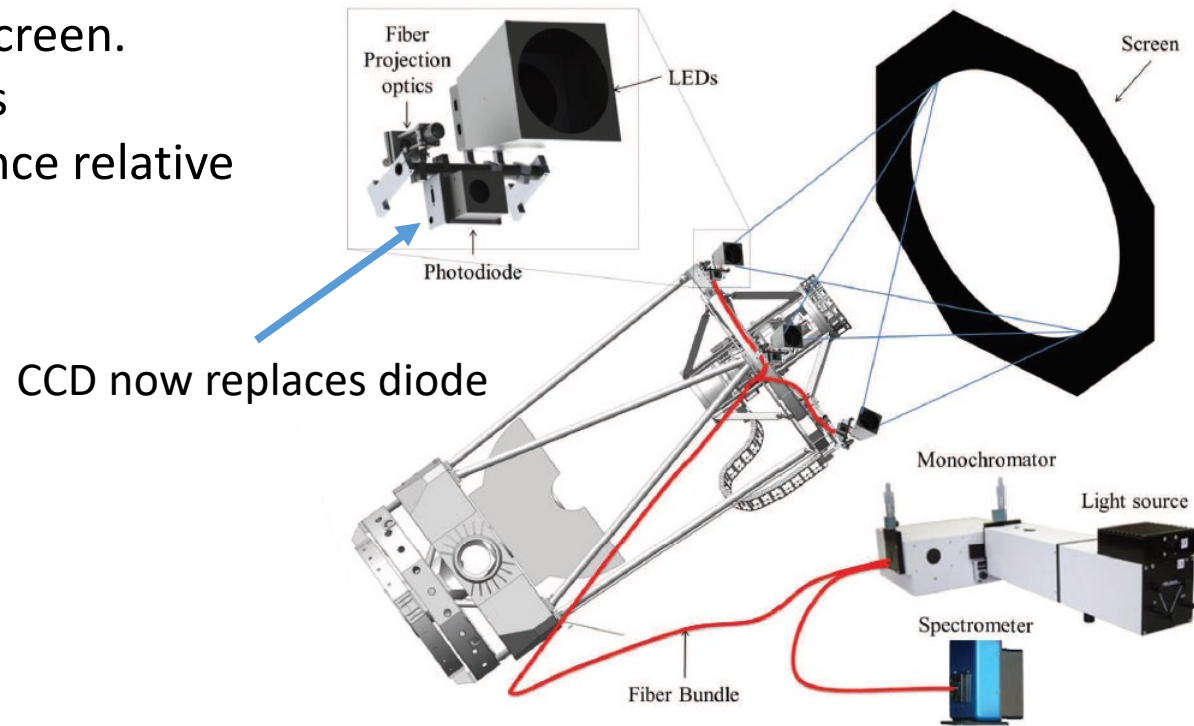
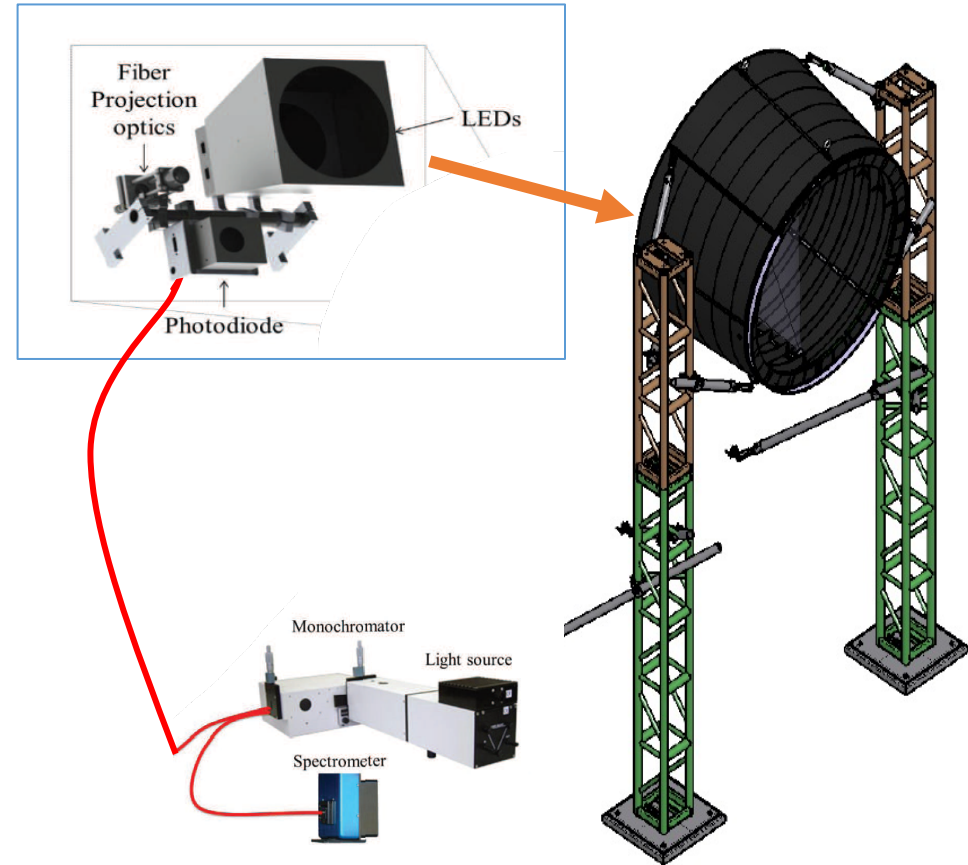
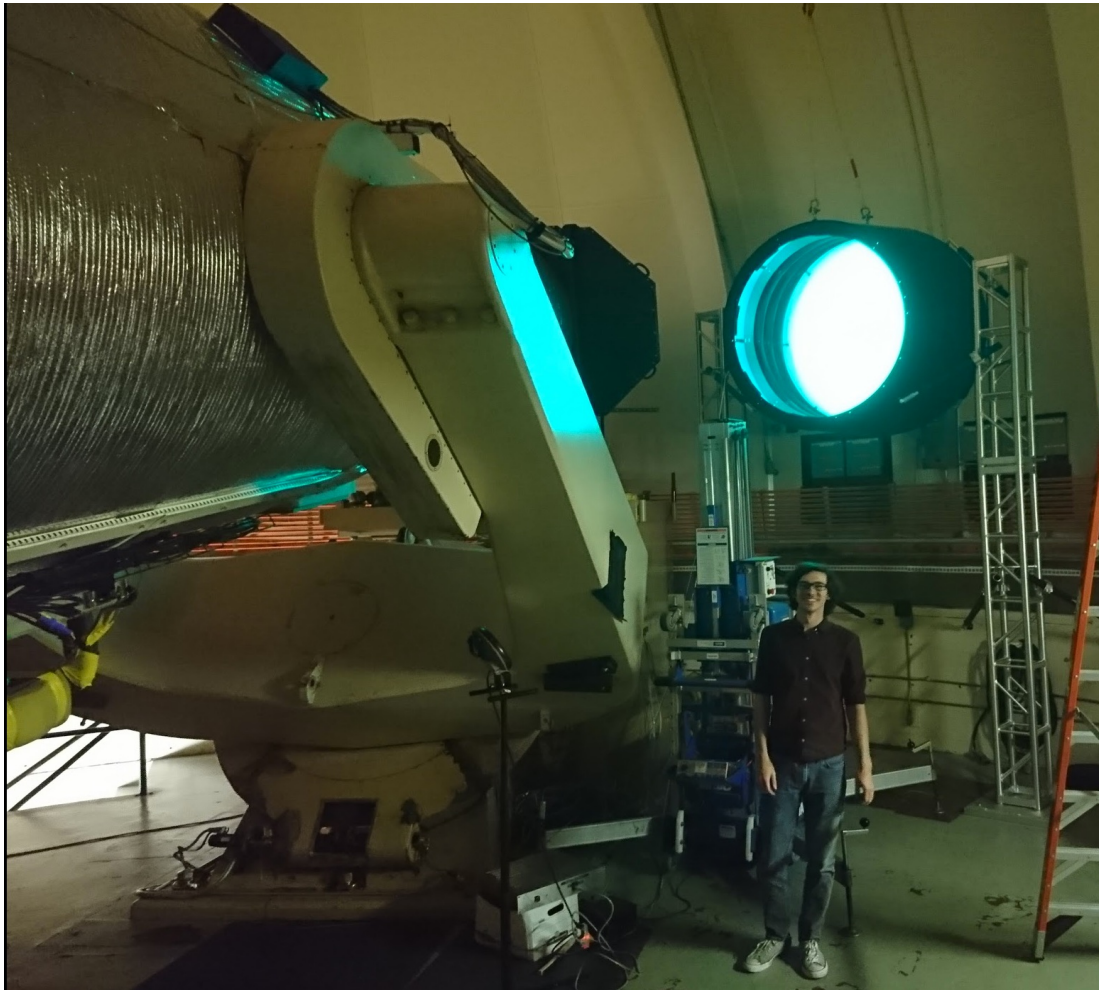


Figure 1. Schematic drawing of the DECal system.

Marsell et al. 2013, astro-ph1302.5720



# ZTF Illuminator screen



# DECals results

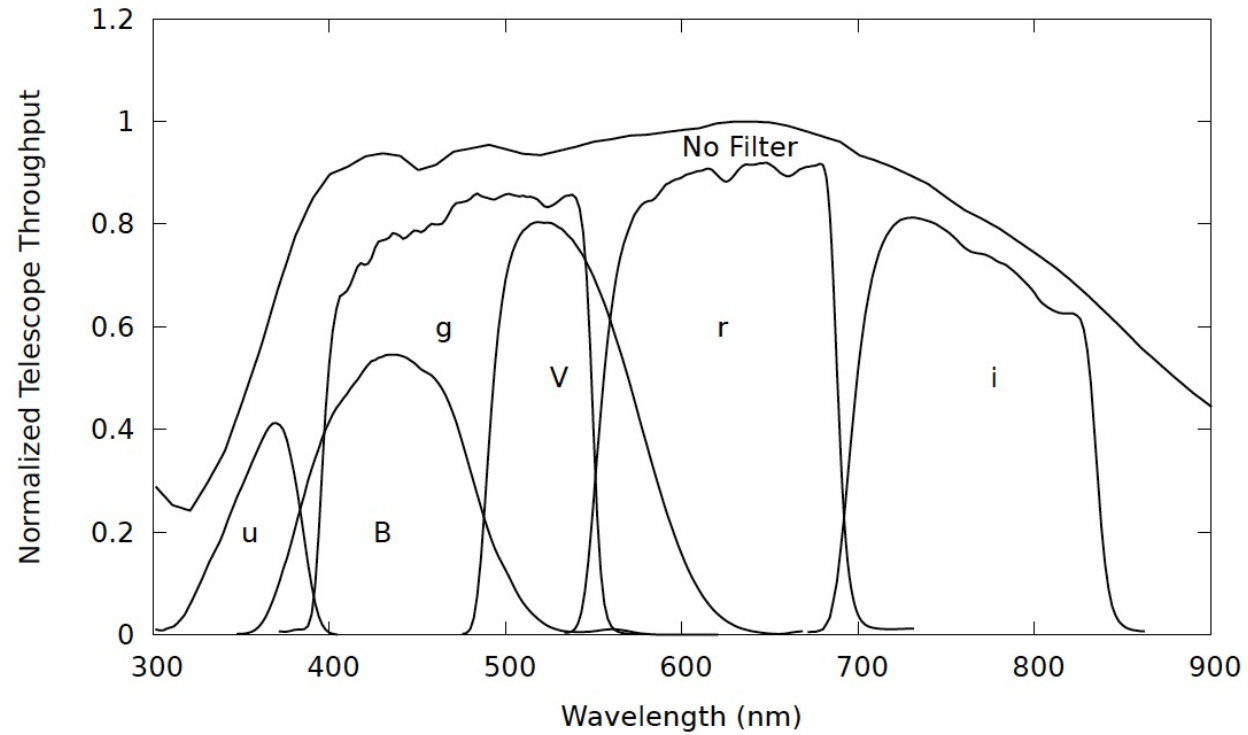


Figure 3. DECals prototype scan of the optical filters used by the CSP survey in the Retrocam instrument on the Swope telescope.



# Calibration Details

- Scan all 3 ZTF filters plus unfiltered.
- In-filter wavelength sampling 2nm.
- Scan out-of-band light leaks 300-1000nm at 5nm width.
- Requires ~2hrs/filter (total ~1 night).
- Calibrate structure to sub-quadrant scales.
- Accurate to ~0.3% (relative not abs).
- Expect June – August 2020.
- Results expected within 2 days.
- If compatible with ZTF illuminator will run during day time.